

SAMOA JOINT CANNERY OUTFALL

2006 Non-tradewind Season

EFFLUENT BIOASSAY TEST RESULTS

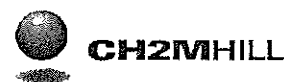
March 2006 Sampling



24 April 2006

CH2M HILL

TECHNICAL MEMORANDUM



BIOASSAY TESTING – JOINT CANNERY OUTFALL EFFLUENT MARCH 2006 SAMPLING

Prepared For: StarKist Samoa (NPDES Permit AS0000019)
COS Samoa Packing (NPDES Permit AS0000027)

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Date: 24 April 2006

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Purpose

This memorandum presents the results of the bioassay testing of the Joint Cannery Outfall effluent sample that was collected in March 2006. The testing is required by the NPDES Permits that became effective in January 2001. This is the eleventh required semi-annual test required by the current permits and the twenty-seventh test conducted since toxicity testing of the Joint Cannery Outfall effluent began in 1993¹.

Study Objectives

Section D.1 of the StarKist Samoa and COS Samoa Packing NPDES Permits requires that semiannual definitive acute bioassays (96-hour static bioassays) be conducted on the cannery effluent. The purpose of these tests is to determine whether, and at what effluent concentration, acute toxicity may be detected for the combined joint cannery effluent discharge into Pago Pago Harbor.

¹ Testing was not conducted during 1999. Extra tests using two organisms were conducted in March 1995 and February 1996.

Study Approach

The U.S. Environmental Protection Agency (USEPA) has conducted a number of reviews of the effluent sampling, analysis, and bioassay tests conducted in the past. All comments from (USEPA have been incorporated into the sampling and sample handling standard operating procedures (SOP) or have been incorporated into the procedures used by the laboratory doing the test. The comments, responses, and SOP have been documented in previous reports.

The NPDES permit conditions require that the bioassay tests be conducted with the white shrimp, *Penaeus vannamei* (postlarvae). In the event *Penaeus vannamei* is not available at the time of the tests, the permit specifies the substitute species, *Mysidopsis bahia*, which now has been renamed *Americamysis bahia*. For the March 2006 sampling, *Penaeus vannamei* was not available and *Americamysis bahia* was used.

Effluent samples were collected from the StarKist Samoa and COS Samoa Packing facilities as 24-hour composite samples. The acute effluent bioassay test was conducted using a combined, flow-weighted, composite effluent sample made up from the effluent samples from both canneries, as allowed by the NPDES permit condition. This combined effluent bioassay is representative of the wastewater discharged from the joint cannery outfall to Pago Pago Harbor.

Effluent Sampling Methods

Between 09:00 on 28 February 2006 and 06:00 on 1 March 2006, a 24-hour flow-weighted composite sample of final effluent was collected from both the StarKist Samoa and COS Samoa Packing effluent discharges. Samples were collected from the established effluent sampling sites. Detailed sampling procedures are described in the established SOP for cannery effluent sampling.

A total of eight grab samples were collected into 1-gallon plastic cubitainers at each cannery. Samples were collected at approximately three-hour intervals over the 24-hour period. The samples were stored on ice or in a refrigerator until the completion of the 24-hour sampling period. After all samples were collected a 5-gallon flow-proportioned composite sample was prepared. The grab sample collection times, effluent flow rates, and the relative effluent flow volumes calculated from plant flow records are summarized in Table 1. The relative effluent flow volumes were used to prepare the final composite sample, which was used to fill the sample container shipped to the laboratory for testing.

A 5-gallon cubitainer containing the composite sample was packed on ice in an ice chest for shipment to the laboratory. A chain-of-custody form for the sample was completed and sealed into a zip-lock bag and taped inside the lid of the ice chest. The sample was shipped via DHL to the testing laboratory. The chain-of-custody form and the DHL waybill are provided in Attachment I.

Table 1
StarKist Samoa and COS Samoa Packing
24-hour Composite Effluent Sample for Bioassay Testing
March 2006

Grab Sample Number	COS Samoa Packing		StarKist Samoa		COS Samoa Packing Percent Of Total Flow	StarKist Samoa Percent Of Total Flow
	Sampling Date and Time	Effluent Flow Rate (mgd)	Sampling Date and Time	Effluent Flow Rate (mgd)		
28 February 2006						
1	09:00	0.88	09:00	1.98	3.57	8.02
2	12:00	0.84	12:00	2.63	3.40	10.66
3	15:00	0.84	15:00	2.61	3.40	10.58
4	18:00	0.80	18:00	1.94	3.24	7.86
5	21:00	0.80	21:00	1.95	3.24	7.91
1 March 2006						
6	00:00	0.80	00:00	2.16	3.24	8.77
7	03:00	0.88	03:00	2.53	3.57	10.25
8	06:00	0.88	06:00	2.15	3.57	8.71
Total		6.72 ^A		17.95 ^A	27.2%	72.8%
Mean		0.84		2.24	Total = %100	
^A Numerical total of column for calculation purposes. Total flow over period will be approximately the calculated mean.						

Bioassay Testing Procedures

EnviroSystems, Inc. located in Hampton, New Hampshire conducted the bioassay tests. The testing procedures and results of the bioassay tests are provided in the laboratory report included as Attachment II. This report summarizes the 96-hour acute bioassay test conducted with reference to the (USEPA) document Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (EPA-821-R-02-012), 2002 as the source of methods for conducting the test. The

bioassay test was conducted considering and including USEPA's comments on previous bioassay tests, as documented in previous reports.

The test organisms were ≤ 5 days old and the test temperature was to be held at a nominal 20 °C, with actual temperatures ranging between 19°C and 21°C. Salinity was adjusted to 25 ppt at the start of the test and ranged during the test between 24 and 28 ppt.

Demonstrated potential for a lethal immediate dissolved oxygen demand (IDOD) and a delayed dissolved oxygen demand spike (DDOD) had been discussed and documented in previous technical memoranda, which describe the first two tests conducted in 1993. Therefore, all of the bioassay test chambers should have been continuously aerated during the bioassay tests to maintain adequate levels of dissolved oxygen (DO)². The test should also be renewed with pre-oxygenated effluent sample at 48 hours. However, the laboratory failed to follow these procedures during this test and the DO went to lethally low levels in the higher effluent concentrations within the twenty four hours of the test. (See the Laboratory Report in Attachment II.)

Because of the low DO levels the toxicity of the effluent could not be determined.
The apparent toxicity caused by the low DO levels is higher than the actual toxicity.
Since the results of the test show that the apparent toxicity (although masked by low DO levels) is still reduced to acceptable levels well within the ZID, the results of the test are being reported below. However, the canneries intend to re-run the test. The new results will be reported when available.

Bioassay tests were carried out for effluent concentrations of 100, 75, 50, 25, 12.5, and 6.25 percent as vol:vol dilutions in seawater. Water quality was monitored daily and parameters measured included DO, pH, salinity, and temperature. Total residual chlorine and ammonia were measured. Water quality data are provided in the Laboratory Report (Attachment II). Reference toxicant tests using sodium dodecyl sulfonate (SDS) are conducted regularly by ESI with the last one completed on 4 January 2006 and results were within the acceptable range based on the 20 most recent laboratory tests.

² The high initial dilution of the actual effluent discharge (>100:1) into the Harbor, in a very short time, eliminates any concern about IDOD effects in the receiving water.

Summary Results: *Americamysis bahia* Effluent Bioassay

All results from the bioassay tests are included in Attachment II. The results of the mysid bioassay tests indicate the 96-hour LC₅₀ for the effluent tested was 35.6 percent. The no observable effects concentration (NOEC) for the 96-hour bioassay was 25 percent and the least observable effects concentration (LOEC) was 50 percent. Results on a daily basis are summarized in Table 2.

Table 2 StarKist Samoa and COS Samoa Packing Combined Effluent Bioassay Results March 2006 Sampling			
Exposure Time	Parameter		
	LC ₅₀	NOEC	LOEC
24 hours	>100%	100%	>100%
48 hours	>63.3%	50%	75%
72 hours	>35.8%	25%	50%
96 hours	>35.6%	25%	>50%

Discussion

Table 3 summarizes the results of the effluent bioassay tests for the samples collected in the March 2006 sampling compared to the previous bioassay tests. The LC₅₀, NOEC, and LOEC are within the range obtained from previous tests where *Americamysis bahia* (*Mysidopsis bahia*) was used in place of *Penaeus vannamei*. Figure 1 summarizes the LC₅₀ for the mysid and penaeid tests done since February 1993. Figure 2 presents the range of LC₅₀ results for mysids tests conducted since 1994. There is some variability observed in test results. The March 2006 test results are among the highest LC₅₀ values recorded for this organism, but because of the DO problems during the test are lower than the results from the last 2½ years. Higher LC₅₀ values indicate lower whole effluent toxicity. There is a possible trend toward lower toxicity (higher LC₅₀) with time (see Figure 2).

Conclusions

The bioassay tests for the Joint Cannery Outfall effluent for March 2006 do not indicate effluent toxicity levels to be of concern. As discussed in the previous bioassay test reports on the effluent, the time scale of the mixing of the effluent with the receiving water is on the order of seconds to achieve dilutions that will eliminate possible toxic effects as reflected by the bioassay results. For example, an LC₅₀ of 35.6 percent after 96 hours of exposure, which was observed in March 2006, corresponds to a dilution of 2.8:1, which is achieved within one second and within one meter of the discharge point. The discharge is located in about 180 feet of water

and the effluent toxicity tests indicate that the discharge is diluted to non-toxic levels immediately after discharge and well within the initial dilution plume.

An LC_{50} of 35.6percent corresponds to 2.8 acute toxicity units (TU_a). A dilution of less than 10:1 will reduce the toxicity to less than 0.3 TU_a which is considered the acceptable level for the protection of aquatic life. The JCO achieves an initial dilution, under critical conditions of greater than 300:1. Therefore, at the edge of the zone of initial dilution (ZID) the acute toxicity is 0.11 TU_a for the LC_{50} documented in this test. Since the test appears to be compromised by low DO depressions during the test the actual toxicity at the edge of the ZID is expected be even lower.

Table 3
StarKist Samoa and COS Samoa Packing
Combined Effluent Bioassay Results

Date	Species	Parameters		
		LC ₅₀	NOEC	LOEC
2/93	<i>Penaeus vannamei</i>	4.8% ¹	3.1%	6.25%
10/93	<i>Penaeus vannamei</i>	15.67%	3.1%	6.25%
2/94	<i>Penaeus vannamei</i>	15.76%	<1.6%	1.6%
10/94	<i>Mysidopsis bahia</i> ²	31.2%	25%	50%
3/95	<i>Penaeus vannamei</i>	14.8%	6.25%	12.5%
3/95	<i>Mysidopsis bahia</i> ³	10.8%	6.25%	12.5%
2/96	<i>Penaeus vannamei</i>	>50%	>50%	>50%
2/96	<i>Mysidopsis bahia</i> ³	28.36%	12.5%	25%
3/96	<i>Penaeus vannamei</i>	44.4%	25%	50%
11/96	<i>Penaeus vannamei</i>	7.11% ¹	3.1%	6.25%
03/97	<i>Penaeus vannamei</i>	39.36%	12.5%	25%
09/97	<i>Penaeus vannamei</i> ⁴	12.3%	6.25%	12.5%
06/98	<i>Mysidopsis bahia</i> ²	17.2%	6.25%	12.5%
11/98	<i>Mysidopsis bahia</i> ²	15%	6.25%	12.5%
02/00	<i>Mysidopsis bahia</i> ²	20%	6.25%	12.5%
08/00	<i>Mysidopsis bahia</i> ²	17.1%	3.1%	6.25%
03/01	<i>Americamysis bahia</i> ^{2,5}	13.8%	12.5%	25%
10/01	<i>Americamysis bahia</i> ^{2,6}	37.5%	25%	50%
3/02	<i>Americamysis bahia</i> ^{2,6}	16.1%	12.5%	25%
8/02	<i>Americamysis bahia</i> ^{2,6}	10.23%	6.25%	12.5%
03/03	<i>Americamysis bahia</i> ^{2,6}	28.4%	25%	50%
08/03	<i>Americamysis bahia</i> ^{2,6}	43.2%	25%	50%
02/04	<i>Americamysis bahia</i> ^{2,6}	>50%	50%	>50%
09/04	<i>Americamysis bahia</i> ^{2,6}	>50%	50%	>50%
03/05	<i>Americamysis bahia</i> ^{2,6}	48.5%	25%	50%
08/05	<i>Americamysis bahia</i> ^{2,6}	>50%	50%	>50%
03/06	<i>Americamysis bahia</i> ^{2,6}	35.6% ⁷	25%	50%

¹ The February 1993 samples were not aerated until after the first day of the test. For subsequent tests the samples were aerated for the entire duration of the tests.

² *Mysidopsis bahia* used as substitutes because *Penaeus vannamei* not available: as directed and approved by USEPA.

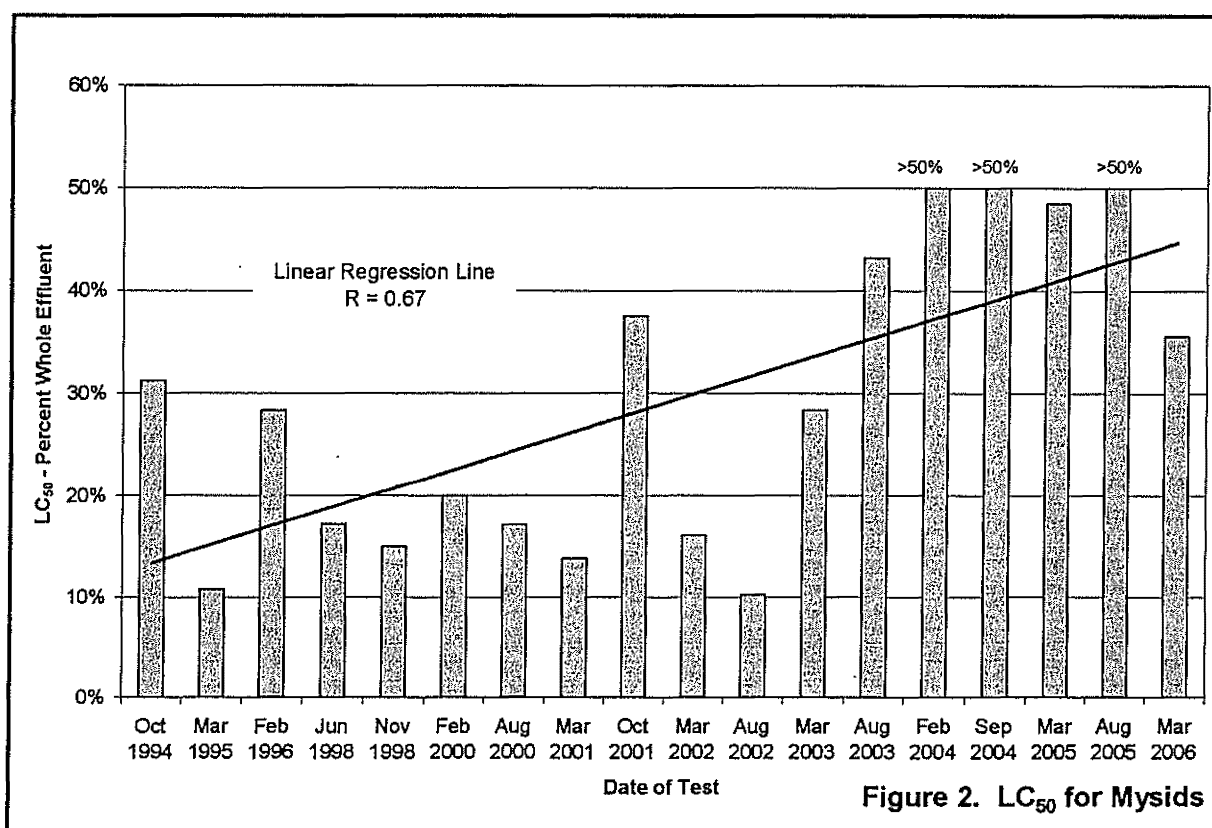
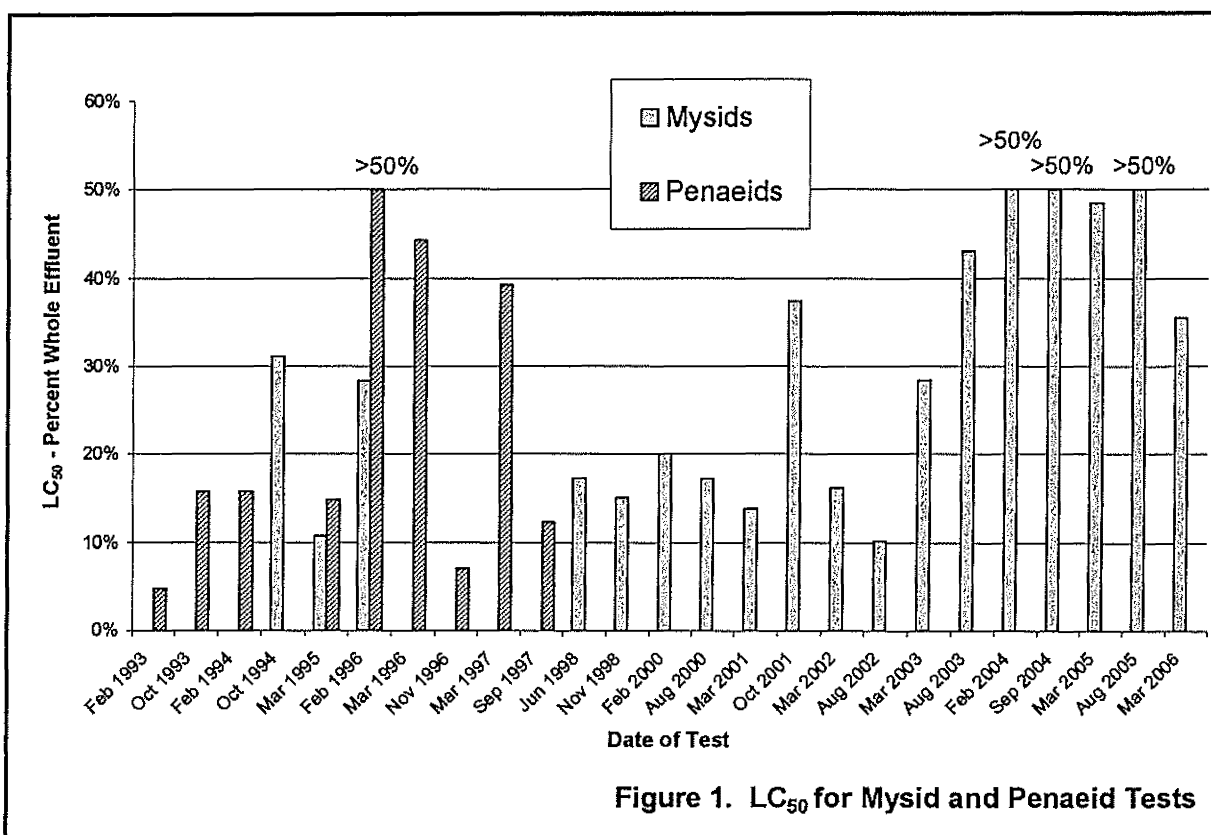
³ *Mysidopsis bahia* used in addition to *Penaeus vannamei* as described in text of technical memorandums reporting test results. Only one species is required by the permit conditions.

⁴ Stage 1 (3 mm) *Penaeus vannamei* were used for testing because older Stage 7 and 8 (8-10 mm) *Penaeus vannamei* were not available.

⁵ *Mysidopsis bahia* renamed *Americamysis bahia*. Results indicate increased toxicity because of low DO in renewal concentrations as renewal water was not aerated prior to use

⁶ *Mysidopsis bahia* renamed *Americamysis bahia*

⁷ Results for this test depressed because aeration was not provided (see text).



ATTACHMENT I

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ATTACHMENT II

EnviroSystems, Inc. Laboratory Report

**TOXICOLOGICAL EVALUATION
OF A TREATED EFFLUENT:
BIOMONITORING SUPPORT FOR A NPDES PERMIT
MARCH 2006**

American Samoa Joint Cannery Outfall

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March 2006
Reference Number CH2M-Samoa14326-06-03

STUDY NUMBER 14326

EXECUTIVE SUMMARY

The following summarizes the results of acute exposure bioassays performed from March 8-12, 2006 in support of the NPDES biomonitoring requirements of the American Samoa Joint Cannery Outfall. The 96 hour acute definitive assay was conducted using the marine species, *Americamysis bahia*.

Acute Toxicity Evaluation				
Species	Exposure	LC-50	NOEC	LOEC
<i>Americamysis bahia</i>	24-Hours	>100%	100%	>100%
	48-Hours	63.3%	50%	75%
	72-Hours	35.8%	25%	50%
	96-Hours	35.6%	25%	50%

**TOXICOLOGICAL EVALUATION
OF A TREATED EFFLUENT:
BIOMONITORING SUPPORT FOR A NPDES PERMIT
MARCH 2006**

American Samoa Joint Cannery Outfall

1.0 INTRODUCTION

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test organisms are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test organisms. Samples with high LC-50 values are less likely to cause significant environmental impact. The acute no observed effect concentration (NOEC) and lowest observed effect concentration (LOEC) document the highest and lowest effluent concentrations that have no impact and a significant impact on the test species, respectively.

This report presents the results of an acute toxicity test conducted on an effluent sample collected from the American Samoa Joint Cannery Outfall. Testing was based on programs and protocols developed by the US EPA (2002) and involved conducting 96 hour acute static renewal toxicity tests with the marine species, *Americamysis bahia*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of the NELAC Standards (2000).

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. See Section 4.0 for a list of references.

2.2 Test Species

Every attempt was made to acquire the species, *Penaeus vannamei*, as this is the preferred organism under the Cannery's permit. ESI was unable to obtain reasonably priced *P. vannamei*. Due to the exorbitant expense, the decision was made to use an alternate species, *Americamysis bahia*.

A. bahia, ≤ 5 days old, were from cultures maintained at Aquatic Research Organisms. Test organisms were transferred to test chambers by large bore pipet, minimizing the amount of water added to test solutions.

2.3 Effluent and Dilution Water

The effluent sample used in the assay was identified as "06NT." Sample collection information is provided in Table 1. Upon receipt, the sample was stored at 4°C. All sample material used in the assay was warmed to 20±1°C prior to preparing test solutions. Total residual chlorine (TRC) was measured using amperometric titration (MDL 0.05 mg/L). As the effluent sample contained <0.05 mg/L, TRC dechlorination with sodium thiosulfate was not required (EPA 2002). Aliquots of the undiluted effluent sample were collected for ammonia analysis when the sample arrived and again prior to renewal. Upon arrival, the effluent sample had a salinity of 11‰. Salinity of the effluent was increased to 25‰ by the addition of artificial sea salts. Test concentrations for the assays were 100%, 75%, 50%, 25%, 12.5%, and 6.25% effluent with a laboratory water diluent control.

The dilution water used in this assay was collected from the sea water system at ESI. The water is pumped in daily from the Hampton Estuary on the flood tide, filtered through a high volume sand filter, and stored in 3000 gallon polyethylene tanks. The water is classified as Class SA-1 by the State of New Hampshire, and has been used to culture test organisms for over 20 years. Sea water used in the assay had a salinity of 25±2‰ and a TRC of <0.05 mg/L.

2.4 Acute Toxicity Tests

The 96 hour acute static renewal toxicity test was conducted at 20±2°C with a photoperiod of 16:8 hours light:dark. Test chambers for the acute assays were 250 mL glass beakers containing 200 mL test solution in each of 5 replicates, with 10 organisms/replicate. Survival, dissolved oxygen, pH, salinity and temperature were measured daily in all replicates. Test solutions were renewed after 48 hours using effluent from the start sample. Mysid shrimp were fed daily with <24 hour old brine shrimp.

2.5 Data Analysis

At 24 hour intervals, survival data was analyzed to assess toxicity using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For acute exposure endpoints statistical significance was accepted at $\alpha < 0.05$.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS

Results of the acute exposure bioassay conducted using the mysid shrimp, *A. bahia*, are summarized in Table 3. Effluent and dilution water characteristics are presented in Table 4. Table 5 provides a summary of historic data associated with the discharge. Support data are included in Appendix A.

3.1 Acute Toxicity Test - *Americamysis bahia*

Minimum test acceptability criteria require $\geq 90\%$ survival in the control concentration. As the laboratory water diluent control met or exceeded this protocol specification, results associated with the assay indicate healthy test organisms and that the dilution water had no adverse impact on the outcome of the assay. These data are considered as valid for evaluating impacts associated with the effluent sample.

Table 3 provides a summary of the acute exposure data and results.

3.2 Summary

The salinity adjusted effluent sample collected from the American Samoa Joint Cannery Outfall did exhibit signs of acute toxicity to the mysid shrimp, *Americamysis bahia*, during the 96 hour exposure period.

4.0 LITERATURE CITED

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.

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Stephan, C. 1982. Documentation for Computing LC-50 Values with a Mini Computer. Unpublished.

US EPA. 2002. *Attachment G: NPDES Whole Effluent Toxicity Testing, Monitoring and Reporting Tips and Common Pitfalls*. Dated December 2002. US EPA Region I Offices, Boston, Massachusetts.

U.S. EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

**TABLE 1. Summary of Sample Collection Information.
American Samoa Joint Cannery Outfall Effluent Evaluation. March 2006.**

Sample Description	Type	Collection		Receipt		Arrival Temp °C
		Date	Time	Date	Time	
EFFLUENT	Comp	02/28-03/01/06	ND	03/08/06	1240	0

**TABLE 2. Summary of Reference Toxicant Data. American Samoa Joint Cannery
Outfall Effluent Evaluation. March 2006.**

			Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
Date	Endpoint		Value		
<i>A. bahia</i>					
01/04/06	Survival	LC-50	17.6	20.1	14.8 - 25.3
					SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3A. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. March 2006.

Concentration % Effluent	Exposure	Replicates					Mean	Standard Deviation	Coefficient of Variation
		A	B	C	D	E			
Lab Control	Start	10	10	10	10	10	100%	0.000	0.00%
	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	10	100%	0.000	0.00%
	72 Hours	9	10	9	10	9	94%	0.055	5.85%
	96-Hours	8	10	9	10	9	92%	0.084	9.13%
6.25%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	9	10	10	10	10	98%	0.045	4.59%
	72 Hours	9	10	10	10	10	98%	0.045	4.59%
	96-Hours	9	10	8	10	10	94%	0.110	11.70%
12.5%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	10	100%	0.000	0.00%
	72 Hours	10	10	10	10	10	100%	0.000	0.00%
	96-Hours	10	9	10	8	10	94%	0.089	9.47%
25%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	10	100%	0.000	0.00%
	72 Hours	10	10	10	9	10	98%	0.045	4.59%
	96-Hours	9	10	10	7	10	92%	0.130	14.13%
50%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	0	9	78%	0.438	56.15%
	72 Hours	1	0	0	0	0	2%	0.045	225.00%
	96-Hours	1	0	0	0	0	2%	0.045	225.00%
75%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	3	5	0	7	7	44%	0.297	67.50%
	72 Hours	0	0	0	0	0	0%	0.000	0.00%
	96-Hours	0	0	0	0	0	0%	0.000	0.00%
100%	24-Hours	10	9	10	8	9	92%	0.084	9.13%
	48-Hours	0	0	0	0	0	0%	0.000	0.00%
	72 Hours	0	0	0	0	0	0%	0.000	0.00%
	96-Hours	0	0	0	0	0	0%	0.000	0.00%

TABLE 3B. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. March 2006.

SUMMARY OF ENDPOINTS				
Exposure Period	LC-50 (95% Limits)	METHOD	NOEC	LOEC
24 Hours	>100%	Direct Observation	100%	>100%
48 Hours	63.3% (58.3-68.7)	Trimmed Spearman-Kärber	50%	75%
72 Hours	35.8% (35.0-36.6)	Trimmed Spearman-Kärber Direct Observation	25%	50%
96 Hours	35.6% (34.6-36.6)	Trimmed Spearman-Kärber Direct Observation	25%	50%

TABLE 4. Summary of Effluent and Diluent Characteristics. American Samoa Joint Cannery Outfall Effluent Evaluation. March 2006.

PARAMETER	UNITS	100% EFFLUENT	50% EFFLUENT	DILUENT
Salinity - As Received	‰	11	-	25
Salinity - After Salinity Adjustment	‰	25	25	-
pH - As Received	SU	6.46	-	7.87
pH - After Salinity Adjustment	SU	7.07	7.22	-
TRC - As Received	mg/L	<0.05	-	<0.05
Dissolved Oxygen - As Received	mg/L	1.3	-	-
Dissolved Oxygen - After Aeration	mg/L	3.6	5.8	7.3
Ammonia - As Received	mg/L as N	23.4	-	<0.1
Unionized Ammonia - As Received	mg/L as N	0.084	-	<0.003
Ammonia - Salinity Adjusted	mg/L as N	-	13	-
Unionized Ammonia - Salinity Adjusted	mg/L as N	-	0.085	-
Ammonia - at 48 Hours	mg/L as N	ND	ND	ND
Unionized Ammonia - at 48 Hours	mg/L as N	ND	ND	ND

Comments: ND= No data. 48 hour ammonia data is not available due to a technician error.

TABLE 5. Summary of StarKist Samoa and COS Samoa Packing Combined Effluent Bioassay Results. American Samoa Joint Cannery Outfall Effluent Evaluation. March 2006.

Date	Species	96-Hour Endpoints		
		LC-50	NOEC	LOEC
02/93 ¹	<i>Penaeus vannamei</i>	4.8%	3.1%	6.25%
10/93 ¹	<i>Penaeus vannamei</i>	15.67%	3.1%	6.25%
02/94 ¹	<i>Penaeus vannamei</i>	15.76%	<1.6%	1.6%
10/94 ¹	<i>Americamysis bahia</i>	31.2%	25.0%	50.0%
03/95 ¹	<i>Penaeus vannamei</i>	14.8%	6.25%	12.5%
03/95 ¹	<i>Americamysis bahia</i>	10.8%	6.25%	12.5%
02/96 ¹	<i>Penaeus vannamei</i>	>50.0%	>50.0%	>50.0%
03/96 ¹	<i>Penaeus vannamei</i>	44.4%	25.0%	50.0%
11/96 ¹	<i>Penaeus vannamei</i>	7.11%	3.1%	6.25%
03/97 ¹	<i>Penaeus vannamei</i>	39.36%	12.5%	25.0%
09/97 ¹	<i>Penaeus vannamei</i>	12.3%	6.25%	12.5%
06/98 ¹	<i>Americamysis bahia</i>	17.2%	6.25%	12.5%
11/98 ¹	<i>Americamysis bahia</i>	15.0%	6.25%	12.5%
02/00 ¹	<i>Americamysis bahia</i>	20.0%	6.25%	12.5%
08/00 ¹	<i>Americamysis bahia</i>	17.1%	3.1%	6.25%
03/01 ²	<i>Americamysis bahia</i>	13.81%	12.5%	25.0%
03/02 ²	<i>Americamysis bahia</i>	16.13%	12.5%	25.0%
08/02 ²	<i>Americamysis bahia</i>	10.23%	6.25%	12.5%
03/03 ²	<i>Americamysis bahia</i>	28.4%	25.0%	50.0%
08/03 ²	<i>Americamysis bahia</i>	43.2%	25.0%	50.0%
03/04 ²	<i>Americamysis bahia</i>	>50.0%	50.0%	>50.0%
10/04 ²	<i>Americamysis bahia</i>	>50.0%	50.0%	>50.0%
03/05 ²	<i>Americamysis bahia</i>	48.5%	25%	50%
10/05 ²	<i>Americamysis bahia</i>	>50.0%	50%	>50
03/06 ²	<i>Americamysis bahia</i>	35.6%	25%	50%

Notes:

¹. Assays conducted by Advanced Biological Testing, Inc., Rohnert Park, California

². Assays conducted by EnviroSystems, Inc., Hampton, New Hampshire

APPENDIX A
DATA SHEETS
STATISTICAL SUPPORT

Contents	Number of Pages
Methods Used in NPDES Permit Biomonitoring Testing	1
<i>A. bahia</i> Acute Bioassay Data Summary	3
<i>A. bahia</i> Survival Statistics: LC-50, NOEC	14
<i>A. bahia</i> Organism Culture Sheet	1
Preparation of Dilutions	1
Record of Meters Used for Water Quality Measurements	1
Unionized Ammonia Calculation	4
Sample Receipt Record	1
Chain of Custody	1

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays	
<i>Ceriodaphnia dubia</i> , <i>Daphnia pulex</i>	EPA-821-R-02-012
<i>Pimephales promelas</i>	EPA-821-R-02-012
<i>Americamysis bahia</i>	EPA-821-R-02-012
<i>Menidia beryllina</i> , <i>Cyprinodon variegatus</i>	EPA-821-R-02-012
Chronic Exposure Bioassays	
<i>Ceriodaphnia dubia</i>	EPA-821-R-02-013, 1002.0
<i>Pimephales promelas</i>	EPA-821-R-02-013, 1000.0
<i>Cyprinodon variegatus</i>	EPA-821-R-02-014, 1004.0
<i>Menidia beryllina</i>	EPA-821-R-02-014, 1006.0
<i>Arbacia punctulata</i>	EPA-821-R-02-014, 1008.0
<i>Champia parvula</i>	EPA-821-R-02-014, 1009.0
Trace Metals:	
ICP Metals	EPA 200.7/SW 6010
Hardness	Standard Methods 20 th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20 th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20 th Edition - Method 5310C
Specific Conductance	Standard Methods 20 th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20 th Edition - Method 4500NH3G
pH	Standard Methods 20 th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20 th Edition - Method 2540.B
Solids, Total Suspended (TSS)	Standard Methods 20 th Edition - Method 2540D
Dissolved Oxygen	Standard Methods 20 th Edition - Method 4500-O G

ACUTE BIOASSAY DATA SUMMARY

STUDY: 14326										"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES											
CLIENT: CH2M Hill					TEST ORGANISM: <i>A. bahia</i>					TRC		AMM 0 HR*		AMM 48 HR*		pH		DO		Salinity	
SAMPLE: American Samoa					ORGANISM SUPPLIER/BATCH/AGE: See Organism Culture Sheet					EFFLUENT		See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet									
DILUENT: LAB SALT										DILUENT											

SALINITY ADJUSTMENT RECORD (IF APPLICABLE): 8000 ML EFFLUENT + 125 G SEA SALTS = 100% ACTUAL PERCENTAGE																														
CONC	REP	SURVIVAL					DISSOLVED OXYGEN (MG/L)					PH (SU)					TEMPERATURE (°C)					SALINITY (ppt)								
		0	24	48	72	96	0	24	48	48☆	72	96	0	24	48	48☆	72	96	0	24	48	48	72	96						
LAB	A	10	10	10	9	8	7.3	7.4	7.0	7.1	7.3	7.2	7.87	7.92	7.86	7.95	7.97	7.87	19	19	20	21	21	19	25	26	27	25	26	27
	B	10	10	10	10	10	7.3	7.3	7.0	7.0	7.4	7.1	7.89	7.95	7.86	7.95	7.99	7.88	19	19	19	21	21	19	25	26	28	25	26	27
	C	10	10	10	9	9	7.3	7.3	7.0	7.0	7.4	7.1	7.90	7.95	7.90	7.95	7.97	7.87	19	19	19	21	20	19	25	26	28	26	25	27
	D	10	10	10	10	10	7.3	7.3	7.0	7.0	6.5	6.0	7.91	7.95	7.87	7.93	7.98	7.92	19	19	19	21	20	19	25	26	27	26	26	27
	E	10	10	10	9	9	7.3	7.5	4.3	7.0	6.5	6.1	7.91	7.98	7.96	7.85	7.91	7.91	19	19	19	21	20	19	25	27	28	25	26	28
6.25%	A	10	10	9	9	8	7.2	7.3	6.6	6.9	7.0	6.0	7.80	7.94	7.97	7.88	7.98	7.92	20	19	19	21	20	19	25	26	27	25	26	28
	B	10	10	10	10	10	7.2	7.2	6.9	6.7	7.2	6.8	7.80	7.93	7.94	7.89	7.99	7.94	20	19	19	21	21	19	25	26	27	25	26	27
	C	10	10	10	10	8	7.2	7.2	6.9	6.6	7.3	6.7	7.80	7.94	7.95	7.88	7.89	7.92	20	19	19	21	21	19	25	26	28	25	26	28
	D	10	10	10	10	10	7.2	7.2	7.0	6.5	6.9	6.3	7.80	7.97	8.00	7.90	7.92	7.92	20	19	20	21	20	19	25	26	29	25	26	27
	E	10	10	10	10	10	7.2	7.2	6.9	6.5	6.5	6.0	7.80	7.97	8.00	7.90	7.99	7.96	20	19	19	21	21	19	25	27	28	25	25	27
DATE	3/18 3/9 3/10 3/11 3/12 3/18 3/9 3/10 3/10 3/11 3/12																													
TIME	1520 1430 1430 1420 1320 1445 1330 1355 1300 1420 1420 1320																													
INITIALS	SJ WD AP AF AF SJ WD AF AF AF AF																													
FED?																														

* - See: "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.

♦ - AERATE FROM START!

◇ - "Old" water qualities (prior to renewal)

☆ - "New" water qualities (post renewal)

ACUTE BIOASSAY DATA SUMMARY

STUDY: 14326		SAMPLE RECEIVED:		"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES													
CLIENT: CH2M Hill		TEST ORGANISM: <i>A. bahia</i>		TRC		AMM 0 HR*		AMM 48 HR*		pH		DO		Salinity			
SAMPLE: American Samoa		ORGANISM SUPPLIER:		EFFLUENT		See											
DILUENT: LAB SALT		ORGANISM BATCH/AGE:		DILUENT		"EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet											

CONC	REP	SURVIVAL					+DISSOLVED OXYGEN (MG/L)+					PH (SU)					TEMPERATURE (°C)					SALINITY (ppt)								
		0	24	48	72	96	0	24	48	48☆	72	96	0	24	48	48☆	72	96	0	24	48	48☆	72	96						
12.5%	A	10	10	10	10	10	6.9	7.8	6.5	6.4	7.0	6.1	7.70	7.86	7.99	7.74	7.97	7.86	20	19	19	21	20	19	25	26	28	26	27	27
	B	10	10	10	10	9	6.9	6.8	6.6	6.3	7.0	6.3	7.68	8.01	7.93	7.75	7.99	7.87	20	19	19	21	20	19	25	26	27	26	26	28
	C	10	10	10	10	10	6.9	6.8	6.6	6.1	7.0	7.0	7.68	8.01	7.96	7.72	8.10	7.87	20	19	19	21	20	19	25	26	27	26	27	28
	D	10	10	10	10	8	6.9	6.9	6.1	6.0	7.1	7.1	7.68	8.01	8.02	7.79	7.83	7.93	20	19	19	21	20	19	25	26	28	26	27	28
	E	10	10	10	10	10	7.0	7.1	6.7	6.2	7.2	7.1	7.68	8.01	8.06	7.78	7.97	7.90	20	19	20	21	21	19	25	27	28	26	27	28
25%	A	10	10	10	10	9	6.5	6.9	6.7	6.0	7.1	7.2	7.50	8.07	8.06	7.56	8.02	7.97	20	19	19	21	20	19	25	26	28	25	27	27
	B	10	10	10	10	10	6.5	6.7	6.6	5.8	7.3	7.3	7.47	8.07	8.05	7.57	8.01	7.98	20	19	19	21	21	19	25	27	27	25	27	27
	C	10	10	10	10	10	6.5	6.7	6.7	5.4	7.2	7.1	7.47	8.00	8.03	7.49	8.01	7.96	20	19	19	21	20	19	25	26	28	26	27	27
	D	10	10	10	9	7	6.5	6.7	6.7	5.3	7.1	7.1	7.47	8.00	8.07	7.49	7.93	7.81	20	19	19	21	21	19	25	26	29	26	27	27
	E	10	10	10	10	10	6.5	6.7	6.6	5.2	7.0	7.0	7.46	7.99	8.07	7.60	7.99	7.93	20	19	19	21	21	19	25	26	28	25	26	28
50%	A	10	10	10	1	1	5.8	5.9	6.6	5.2	7.1	7.3	7.22	8.04	8.12	7.27	8.10	7.91	20	19	19	21	21	—	25	26	26	25	27	27
	B	10	10	10	0	—	5.8	5.8	6.6	3.5	7.1	—	7.21	7.93	8.04	7.29	8.11	—	20	19	19	21	20	—	25	25	26	26	26	—
	C	10	10	10	0	—	5.8	5.4	6.6	3.5	7.0	—	7.20	7.97	8.13	7.21	8.10	—	20	19	19	21	20	—	25	26	27	25	26	—
	D	10	10	0	—	—	5.8	6.7	6.5	—	—	—	7.20	7.60	8.14	—	—	—	20	19	19	—	—	—	25	26	27	—	—	—
	E	10	10	9	0	—	5.6	5.3	6.6	3.4	7.2	—	7.20	8.03	8.18	7.20	8.09	—	20	20	20	21	20	—	25	26	27	25	27	—
DATE	3/8	3/9	3/10	3/11	3/12	3/8	3/9	3/10	3/10	3/11	3/12																			
TIME	1520	1430	1445	1420	1320	1445	1330	1335	1500	1420	1320																			
INITIALS	SJ	WD	AF	AF	AF	SJ	WD	AF	AF	AF	AF																			
FED?																														

* - See: "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.

♦ - AERATE FROM START!

◇ - "Old" water qualities (prior to renewal)

☆ - "New" water qualities (post renewal)

ACUTE BIOASSAY DATA SUMMARY

STUDY: 14326		SAMPLE RECEIVED:		"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES													
CLIENT: CH2M Hill		TEST ORGANISM: <i>A. bahia</i>		TRC		AMM 0 HR*		AMM 48 HR*		pH		DO		Salinity			
SAMPLE: American Samoa		ORGANISM SUPPLIER:		EFFLUENT		See											
DILUENT: LAB SALT		ORGANISM BATCH/AGE:		DILUENT		"EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet											

CONC	REP	SURVIVAL					+DISSOLVED OXYGEN (MG/L)+					PH (SU)					TEMPERATURE (°C)					SALINITY (ppt)								
		0	24	48	72	96	0	24	48	48☆	72	96	0	24	48	48☆	72	96	0	24	48	48☆	72	96						
75%	A	10	10	3	0	-	4.8	4.2	6.5	2.9	6.9	-	7.07	7.91	8.19	7.18	8.13	-	20	20	19	20	20	-	24	25	26	26	26	-
	B	10	10	5	0	-	4.6	4.2	6.6	2.6	6.9	-	7.06	7.92	8.19	7.10	8.11	-	20	19	19	20	20	-	24	25	26	25	26	-
	C	10	10	0	-	-	4.7	0.3	6.6	-	-	-	7.06	7.78	8.19	-	-	-	20	19	19	-	-	-	24	25	26	-	-	
	D	10	10	7	0	-	4.7	4.1	6.6	2.5	7.1	-	7.06	7.99	8.19	7.15	8.16	-	20	19	19	21	20	21	24	25	27	25	27	27
	E	10	10	7	0	-	4.7	4.4	6.6	2.5	7.0	-	7.06	8.03	8.30	7.20	8.20	-	20	20	19	21	20	21	24	26	27	25	26	26
100%	A	10	10	0	-	-	3.6	3.6	6.5	2.9	6.9	6.1	6.96	8.07	8.37	6.99	8.09	8.11	20	20	19	21	20	21	24	26	26	25	26	27
	B	10	9	0	-	-	3.6	3.3	6.5	-	-	-	6.96	8.05	8.41	-	-	-	20	20	19	-	-	-	24	26	26	-	-	
	C	10	10	0	-	-	3.6	1.7	6.3	-	-	-	6.96	7.86	8.23	-	-	-	20	20	19	-	-	-	24	25	26	-	-	
	D	10	8	0	-	-	3.6	2.7	6.5	-	-	-	6.96	7.98	8.23	-	-	-	20	20	19	-	-	-	24	25	27	-	-	
	E	10	9	0	-	-	3.6	3.2	6.4	2.8	-	-	6.96	8.02	8.16	-	-	-	20	20	19	-	-	-	24	25	27	-	-	
DATE		3/8	3/9	3/10	3/11	3/12	3/8	3/9	3/10	3/10	3/11	3/12																		
TIME		1520	1430	1450	1420	1320	1445	1330	1335	1500	1420	1320																		
INITIALS		SJ	WD	AF	AF	AF	SJ	WD	AF	AF	AF	AF																		
FED?																														

* - See: "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.

♦ - AERATE FROM START!

◇ - "Old" water qualities (prior to renewal)

☆ - "New" water qualities (post renewal)

CETIS Test Summary

Report Date: 16 Mar-06 5:33 PM

Link: 11-3381-8273

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.
Test No:	07-1088-3899	Test Type:	Survival (96h)	Duration:	94h	
Start Date:	08 Mar-06 03:20 PM	Protocol:	EPA/821/R-02-012 (2002)	Species:	Americamysis bahia	
Ending Date:	12 Mar-06 01:20 PM	Dil Water:	Natural Seawater	Source:	ARO - Aquatic Research Organisms, N	
Setup Date:	08 Mar-06 03:20 PM	Brine:	Not Applicable			
Sample No:	02-2666-6345	Material:	Industrial Effluent	Client:	CH2M Hill	
Sample Date:	01 Mar-06 12:00 PM	Code:	14326	Project:	WET Quarterly Compliance Test (1Q)	
Receive Date:	08 Mar-06 12:00 PM	Source:	CH2M Hill- American Samoa			
Sample Age:	7d 3h	Station:	Joint Cannery Outfall			
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
16-8050-0151	24h Proportion Survived	100	> 100	N/A	5.33%	Steel's Many-One Rank
14-9795-7901	48h Proportion Survived	50	75	61.237	27.87%	Steel's Many-One Rank
20-2463-6746	72h Proportion Survived	25	50	35.355	6.62%	Dunnett's Multiple Comparison
05-5702-4063	96h Proportion Survived	25	50	35.355	15.68%	Steel's Many-One Rank
Point Estimate Summary						
Analysis	Endpoint	% Effect	Conc-%	95% LCL	95% UCL	Method
04-6135-6263	48h Proportion Survived	50	63.25922	58.26902	68.67678	Trimmed Spearman-Kärber
13-7987-5949	72h Proportion Survived	50	35.75597	34.97713	36.55215	Trimmed Spearman-Kärber
16-2376-3199	96h Proportion Survived	50	35.59903	34.61591	36.61006	Trimmed Spearman-Kärber
Test Acceptability						
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision	
05-5702-4063	96h Proportion Survived	Control Response	0.92	0.9 - N/A	Passes acceptability criteria	
16-2376-3199	96h Proportion Survived	Control Response	0.92	0.9 - N/A	Passes acceptability criteria	

CETIS Test Summary

 Report Date: 16 Mar-06 5:33 PM
 Link: 11-3381-8273

24h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
50		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
75		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		5	0.92000	0.80000	1.00000	0.03742	0.08367	9.09%
48h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
6.25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
50		5	0.78000	0.00000	1.00000	0.19596	0.43818	56.18%
75		5	0.44000	0.00000	0.70000	0.13266	0.29665	67.42%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
72h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.94000	0.90000	1.00000	0.02449	0.05477	5.83%
6.25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
50		5	0.02000	0.00000	0.10000	0.02000	0.04472	223.61
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
96h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.92000	0.80000	1.00000	0.03742	0.08367	9.09%
6.25		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
12.5		5	0.94000	0.80000	1.00000	0.04000	0.08944	9.52%
25		5	0.92000	0.70000	1.00000	0.05831	0.13038	14.17%
50		5	0.02000	0.00000	0.10000	0.02000	0.04472	223.61
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

CETIS Test Summary

Report Date:

16 Mar-06 5:33 PM

Link:

11-3381-8273

24h Proportion Survived Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	1.00000	1.00000
50		1.00000	1.00000	1.00000	1.00000	1.00000
75		1.00000	1.00000	1.00000	1.00000	1.00000
100		1.00000	0.90000	1.00000	0.80000	0.90000
48h Proportion Survived Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000
6.25		0.90000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	1.00000	1.00000
50		1.00000	1.00000	1.00000	0.00000	0.90000
75		0.30000	0.50000	0.00000	0.70000	0.70000
100		0.00000	0.00000	0.00000	0.00000	0.00000
72h Proportion Survived Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	0.90000	1.00000	0.90000	1.00000	0.90000
6.25		0.90000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	0.90000	1.00000
50		0.10000	0.00000	0.00000	0.00000	0.00000
75		0.00000	0.00000	0.00000	0.00000	0.00000
100		0.00000	0.00000	0.00000	0.00000	0.00000
96h Proportion Survived Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	0.80000	1.00000	0.90000	1.00000	0.90000
6.25		0.80000	1.00000	0.80000	1.00000	1.00000
12.5		1.00000	0.90000	1.00000	0.80000	1.00000
25		0.90000	1.00000	1.00000	0.70000	1.00000
50		0.10000	0.00000	0.00000	0.00000	0.00000
75		0.00000	0.00000	0.00000	0.00000	0.00000
100		0.00000	0.00000	0.00000	0.00000	0.00000

CETIS Analysis Detail

Comparisons: Page 1 of 8
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 05-5702-4063

Americamysis 96-h Acute Survival Test										EnviroSystems, Inc.	
Test No:	07-1088-3899		Test Type: Survival (96h)				Duration: 94h				
Start Date:	08 Mar-06 03:20 PM		Protocol: EPA/821/R-02-012 (2002)				Species: Americamysis bahia				
Ending Date:	12 Mar-06 01:20 PM		Dil Water: Natural Seawater				Source: ARO - Aquatic Research Organisms, N				
Setup Date:	08 Mar-06 03:20 PM		Brine: Not Applicable								
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
96h Proportion Survived		Comparison		11-3381-8273		11-3381-8273		16 Mar-06 5:22 PM		CETISv1.026	
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Steel's Many-One Rank		C > T	Angular (Corrected)			25	50	4.00	35.355	15.68%	
Test Acceptability											
Attribute		Statistic		Acceptable Range		Decision					
Control Response		0.92		0.9 - N/A		Passes acceptability criteria					
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Bartlett		3.04008		13.27671		0.55114		Equal Variances	
Distribution		Shapiro-Wilk W		0.84838		0.88746		0.00137		Non-normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		4.896395		1.224099		4		59.64		0.00000	
Error		0.4104991		0.020525		20					
Total		5.30689383		1.2446236		24					
Group Comparisons											
Control		vs	Conc-%	Statistic		Critical		P Level		Ties	
Lab Water			6.25	28		17		> 0.0500		3	
			12.5	29.5		17		> 0.0500		3	
			25	29		17		> 0.0500		2	
			50	15		17		<= 0.0500		3	
Data Summary											
			Original Data				Transformed Data				
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
0	Lab Water	5	0.92000	0.80000	1.00000	0.08367	1.28585	1.10715	1.41202	0.12892	
6.25		5	0.92000	0.80000	1.00000	0.10954	1.29007	1.10715	1.41202	0.16698	
12.5		5	0.94000	0.80000	1.00000	0.08944	1.31845	1.10715	1.41202	0.13759	
25		5	0.92000	0.70000	1.00000	0.13038	1.29525	0.99116	1.41202	0.18406	
50		5	0.02000	0.00000	0.10000	0.04472	0.19137	0.15878	0.32175	0.07288	
Data Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	0.80000	1.00000	0.90000	1.00000	0.90000					
6.25		0.80000	1.00000	0.80000	1.00000	1.00000					
12.5		1.00000	0.90000	1.00000	0.80000	1.00000					
25		0.90000	1.00000	1.00000	0.70000	1.00000					
50		0.10000	0.00000	0.00000	0.00000	0.00000					

CETIS Analysis Detail

Comparisons:

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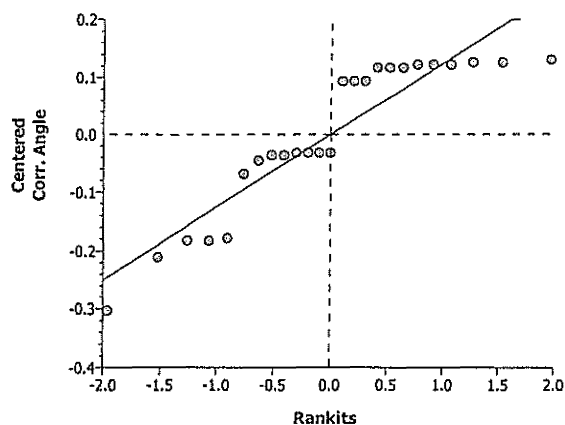
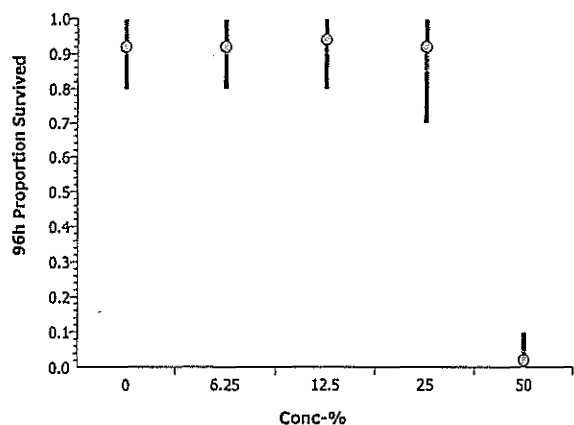
Report Date:

16 Mar-06 5:33 PM

Analysis:

05-5702-4063

Graphics

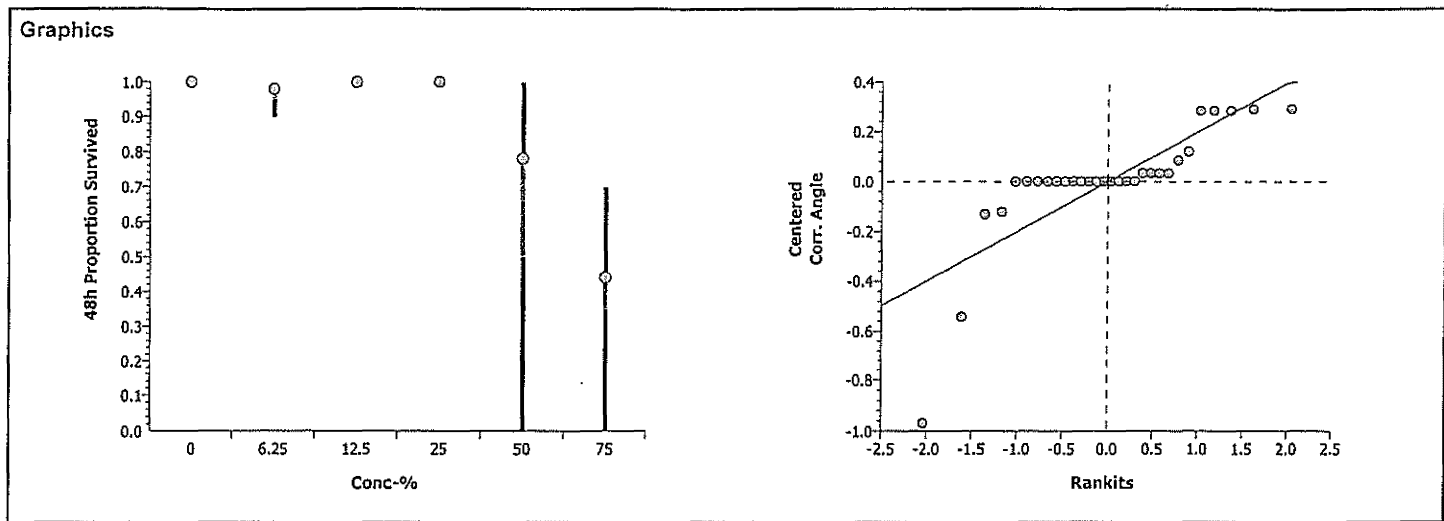


CETIS Analysis Detail

Comparisons: Page 3 of 8
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 14-9795-7901

Americamysis 96-h Acute Survival Test							EnviroSystems, Inc.			
Test No:	07-1088-3899		Test Type: Survival (96h)			Duration:		94h		
Start Date:	08 Mar-06 03:20 PM		Protocol: EPA/821/R-02-012 (2002)			Species:		Americamysis bahia		
Ending Date:	12 Mar-06 01:20 PM		Dil Water: Natural Seawater			Source:		ARO - Aquatic Research Organisms, N		
Setup Date:	08 Mar-06 03:20 PM		Brine: Not Applicable							
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version
48h Proportion Survived		Comparison		11-3381-8273		11-3381-8273		16 Mar-06 5:22 PM		CETISv1.026
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Steel's Many-One Rank		C > T	Angular (Corrected)		50	75	2.00	61.237	27.87%	
ANOVA Assumptions										
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)
Variances		Modified Levene		2.41905		3.89507		0.06536		Equal Variances
Distribution		Shapiro-Wilk W		0.67006		0.89981		0.00000		Non-normal Distribution
ANOVA Table										
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level
Between		2.054252		0.4108503		5		5.80		0.00120
Error		1.701514		0.0708964		24				Significant Effect
Total		3.7557658		0.4817467		29				
Group Comparisons										
Control		vs	Conc-%	Statistic		Critical		P Level		Ties
Lab Water			6.25	25		16		> 0.0500		1
			12.5	27.5		16		> 0.0500		1
			25	27.5		16		> 0.0500		1
			50	22.5		16		> 0.0500		1
			75	15		16		<= 0.0500		2
Data Summary										
			Original Data				Transformed Data			
Conc-%		Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum
0		Lab Water	5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202
6.25			5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202
12.5			5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202
25			5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202
50			5	0.78000	0.00000	1.00000	0.43818	1.12877	0.15878	1.41202
75			5	0.44000	0.00000	0.70000	0.29665	0.70123	0.15878	0.99116
Data Detail										
Conc-%		Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0		Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000			
6.25			0.90000	1.00000	1.00000	1.00000	1.00000			
12.5			1.00000	1.00000	1.00000	1.00000	1.00000			
25			1.00000	1.00000	1.00000	1.00000	1.00000			
50			1.00000	1.00000	1.00000	0.00000	0.90000			
75			0.30000	0.50000	0.00000	0.70000	0.70000			

CETIS Analysis Detail



CETIS Analysis Detail

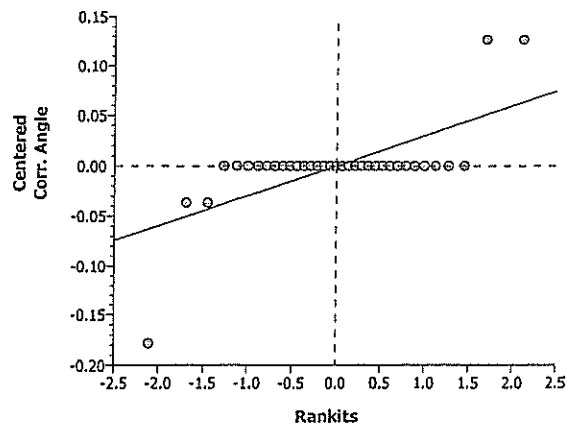
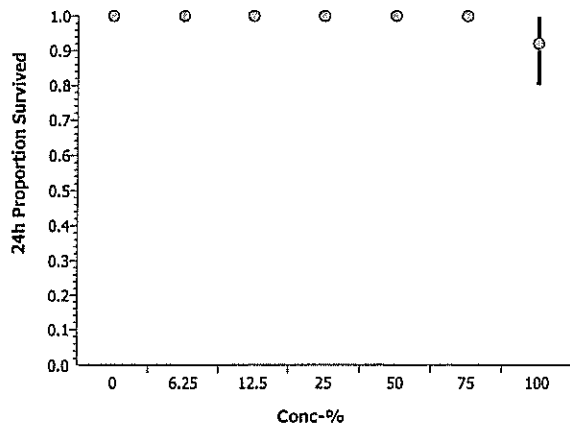
Comparisons: Page 5 of 8
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 16-8050-0151

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.					
Test No:	07-1088-3899		Test Type:		Survival (96h)		Duration:		94h		
Start Date:	08 Mar-06 03:20 PM		Protocol:		EPA/821/R-02-012 (2002)		Species:		Americamysis bahia		
Ending Date:	12 Mar-06 01:20 PM		Dil Water:		Natural Seawater		Source:		ARO - Aquatic Research Organisms, N		
Setup Date:	08 Mar-06 03:20 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
24h Proportion Survived		Comparison		11-3381-8273		11-3381-8273		16 Mar-06 5:22 PM		CETISv1.026	
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Steel's Many-One Rank		C > T	Angular (Corrected)		100	>100	1.00	N/A	5.33%		
ANOVA Assumptions											
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)					
Variances		Modified Levene	12.20194	3.52756	0.00000	Unequal Variances					
Distribution		Shapiro-Wilk W	0.48733	0.91004	0.00000	Non-normal Distribution					
ANOVA Table											
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)				
Between		0.0682147	0.0113691	6	4.79	0.00178	Significant Effect				
Error		0.0664790	0.0023743	28							
Total		0.13469368	0.0137434	34							
Group Comparisons											
Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)				
Lab Water		6.25	27.5	16	> 0.0500	1	Non-Significant Effect				
		12.5	27.5	16	> 0.0500	1	Non-Significant Effect				
		25	27.5	16	> 0.0500	1	Non-Significant Effect				
		50	27.5	16	> 0.0500	1	Non-Significant Effect				
		75	27.5	16	> 0.0500	1	Non-Significant Effect				
		100	20	16	> 0.0500	2	Non-Significant Effect				
Data Summary											
		Original Data					Transformed Data				
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026	
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026	
12.5		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026	
25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026	
50		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026	
75		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026	
100		5	0.92000	0.80000	1.00000	0.08367	1.28585	1.10715	1.41202	0.12892	
Data Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	1.00000	1.00000	1.00000	1.00000					
25		1.00000	1.00000	1.00000	1.00000	1.00000					
50		1.00000	1.00000	1.00000	1.00000	1.00000					
75		1.00000	1.00000	1.00000	1.00000	1.00000					
100		1.00000	0.90000	1.00000	0.80000	0.90000					

CETIS Analysis Detail

Comparisons: Page 6 of 8
Report Date: 16 Mar-06 5:33 PM
Analysis: 16-8050-0151

Graphics



CETIS Analysis Detail

Comparisons: Page 7 of 8
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 20-2463-6746

Americamysis 96-h Acute Survival Test EnviroSystems, Inc.

Test No: 07-1088-3899	Test Type: Survival (96h)	Duration: 94h
Start Date: 08 Mar-06 03:20 PM	Protocol: EPA/821/R-02-012 (2002)	Species: Americamysis bahia
Ending Date: 12 Mar-06 01:20 PM	Dil Water: Natural Seawater	Source: ARO - Aquatic Research Organisms, N
Setup Date: 08 Mar-06 03:20 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
72h Proportion Survived	Comparison	11-3381-8273	11-3381-8273	16 Mar-06 5:22 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		25	50	4.00	35.355	6.62%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.15385	4.43069	0.36047	Equal Variances
Distribution	Shapiro-Wilk W	0.94255	0.88746	0.17907	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.59388	1.39847	4	292.53	0.00000	Significant Effect
Error	0.0956136	0.0047807	20			
Total	5.68949377	1.4032507	24			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Lab Water		6.25	-1.4907	2.3	> 0.0500	0.10058	Non-Significant Effect
		12.5	-2.2361	2.3	> 0.0500	0.10058	Non-Significant Effect
		25	-1.4907	2.3	> 0.0500	0.10058	Non-Significant Effect
		50	25.6774	2.3	<= 0.0500	0.10058	Significant Effect

Data Summary

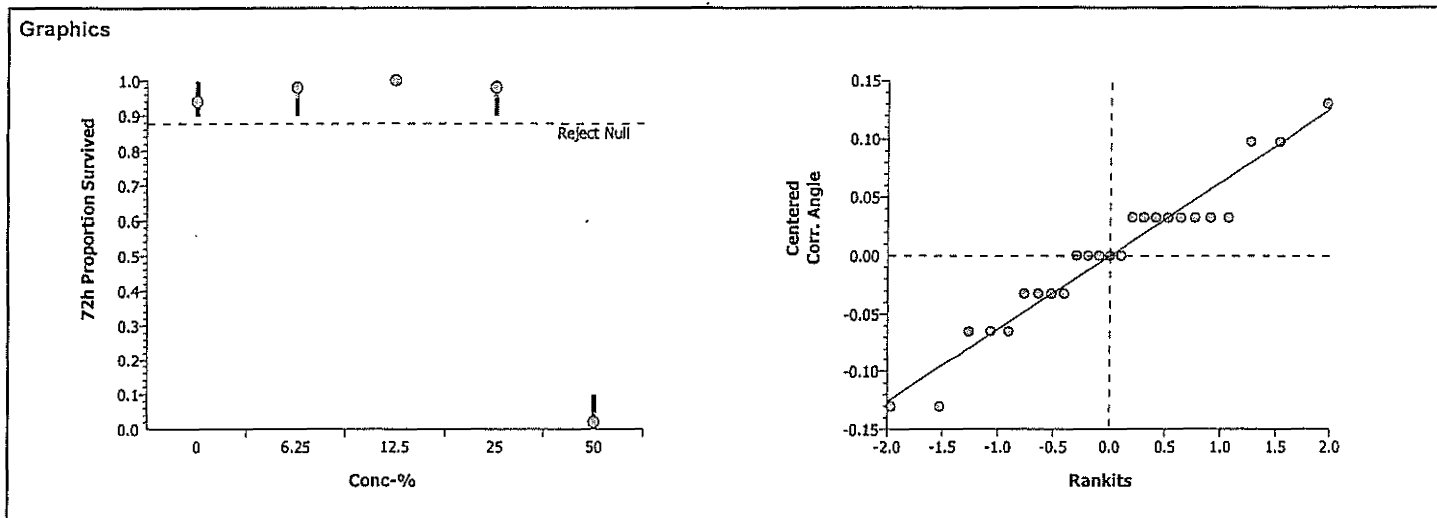
		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.94000	0.90000	1.00000	0.05477	1.31423	1.24905	1.41202	0.08926
6.25		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
12.5		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
25		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
50		5	0.02000	0.00000	0.10000	0.04472	0.19137	0.15878	0.32175	0.07288

Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	0.90000	1.00000	0.90000	1.00000	0.90000					
6.25		0.90000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	1.00000	1.00000	1.00000	1.00000					
25		1.00000	1.00000	1.00000	0.90000	1.00000					
50		0.10000	0.00000	0.00000	0.00000	0.00000					

CETIS Analysis Detail

Comparisons: Page 8 of 8
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 20-2463-6746



CETIS Analysis Detail

Spearman-Kärber: Page 1 of 3
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 04-6135-6263

Americamysis 96-h Acute Survival Test EnviroSystems, Inc.

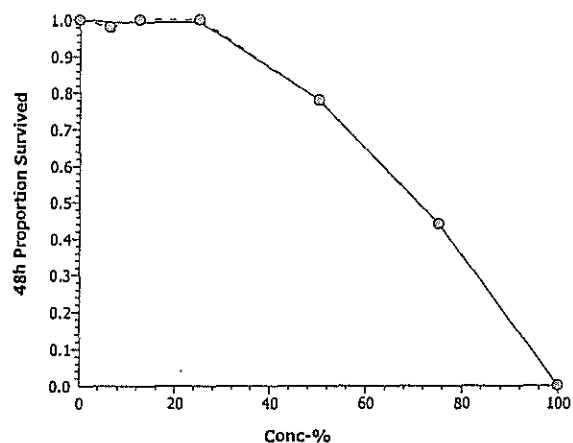
Test No: 07-1088-3899	Test Type: Survival (96h)	Duration: 94h
Start Date: 08 Mar-06 03:20 PM	Protocol: EPA/821/R-02-012 (2002)	Species: Americamysis bahia
Ending Date: 12 Mar-06 01:20 PM	Dil Water: Natural Seawater	Source: ARO - Aquatic Research Organisms, N
Setup Date: 08 Mar-06 03:20 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Trimmed Spearman-Kärber	11-3381-8273	11-3381-8273	16 Mar-06 5:30 PM	CETISv1.026

Spearman-Kärber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0	0.67%	1.801124	0.01784305	63.25922	58.26902	68.67678

Data Summary			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
6.25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
50		5	0.78000	0.00000	1.00000	0.08944	0.43818	39	50
75		5	0.44000	0.00000	0.70000	0.06055	0.29665	22	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

Graphics



CETIS Analysis Detail

Spearman-Kärber: Page 2 of 3
 Report Date: 16 Mar-06 5:33 PM
 Analysis: 13-7987-5949

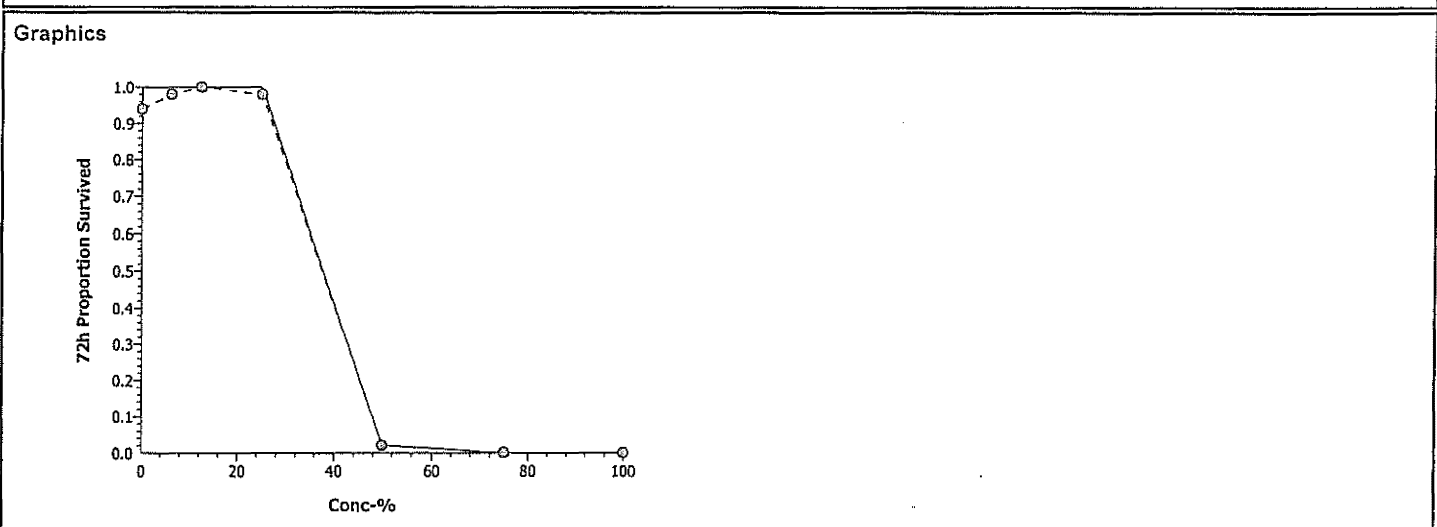
Americamysis 96-h Acute Survival Test					EnviroSystems, Inc.
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Test No: 07-1088-3899	Test Type: Survival (96h)	Duration: 94h
Start Date: 08 Mar-06 03:20 PM	Protocol: EPA/821/R-02-012 (2002)	Species: Americamysis bahia
Ending Date: 12 Mar-06 01:20 PM	Dil Water: Natural Seawater	Source: ARO - Aquatic Research Organisms, N
Setup Date: 08 Mar-06 03:20 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
72h Proportion Survived	Trimmed Spearman-Kärber	11-3381-8273	11-3381-8273	16 Mar-06 5:29 PM	CETISv1.026

Spearman-Kärber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0.06	0.00%	1.553349	0.004782179	35.75597	34.97713	36.55215

Data Summary			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.94000	0.90000	1.00000	0.01118	0.05477	47	50
6.25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
50		5	0.02000	0.00000	0.10000	0.00913	0.04472	1	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.			
Test No:	07-1088-3899	Test Type:	Survival (96h)	Duration:	94h				
Start Date:	08 Mar-06 03:20 PM	Protocol:	EPA/821/R-02-012 (2002)	Species:	Americamysis bahia				
Ending Date:	12 Mar-06 01:20 PM	Dil Water:	Natural Seawater	Source:	ARO - Aquatic Research Organisms, N				
Setup Date:	08 Mar-06 03:20 PM	Brine:	Not Applicable						
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
96h Proportion Survived	Trimmed Spearman-Kärber	11-3381-8273	11-3381-8273	16 Mar-06 5:27 PM	CETISv1.026				
Spearman-Kärber Options					Point Estimates				
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL		
Control Threshold	0.08	0.00%	1.551438	0.006081175	35.59903	34.61591	36.61006		
Test Acceptability									
Attribute	Statistic	Acceptable Range	Decision						
Control Response	0.92	0.9 - N/A	Passes acceptability criteria						
Data Summary			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.92000	0.80000	1.00000	0.01708	0.08367	46	50
6.25		5	0.92000	0.80000	1.00000	0.02236	0.10954	46	50
12.5		5	0.94000	0.80000	1.00000	0.01826	0.08944	47	50
25		5	0.92000	0.70000	1.00000	0.02661	0.13038	46	50
50		5	0.02000	0.00000	0.10000	0.00913	0.04472	1	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
Graphics									



Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS bahia

Source: Lab reared ☒ Hatchery reared ☐ Field collected ☐

Hatch date 3-3-06 Receipt date

Lot number 030306 MS Strain

Brood Origination FLORIDA

II. Water Quality

Temperature 25°C Salinity ~30 ppt DO

pH 7.8 Hardness ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ☒ Phytoplankton ☐ Trout Chow ☒

Brine Shrimp ☒ Rotifers ☐ Other ENCAP. SHRIMP DIET

Prophylactic Treatments:

Comments:

IV. Shipping Information

Client: ESI # of Organisms: 350+

Carrier: Date Shipped: 3-7-06

Biologist: Mark Donaghy

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA

PARAMETER	100% Effluent	50% Effluent	Diluent - Lab Salt
TRC	<0.05		<0.05
As Received - pH (SU) @ 20°C	6.46		7.87
As Received - Salinity (ppt)	11.4		25
As Received - Dissolved Oxygen (mg/L)†	1.3		7.3
As Received - Ammonia (pull)	-002		-005
Salinity Adjusted - pH (SU) @ 20°C	7.07	(3) 7.27 7.22	
Salinity Adjusted - Salinity (ppt)	24	25	
After Aeration - Dissolved Oxygen (mg/L)	3.6	(3) 5.8 5.8	
Salinity Adjusted - Ammonia (pull)		-003	
48 hour Ammonia (pull)			
48 hour pH (SU) @ 20°C		7.27	7.95

- Aerate prior to mixing concentrations.

PREPARATION OF DILUTIONS

STUDY: 14326			CLIENT: CH2M HILL - American Samoa					
SPECIES: <i>A. bahia</i>								
Diluent:	Day: 0		Day: 2					
Lab Salt	Sample: EOA		Sample:					
Concentration	Vol. Eff.	Final Vol	Vol. Eff.	Final Vol	HRS	Date	Time	Initials
LAB	0	1000	0	1000/1000	0	3/8/06	1430	SJ
6.25%	62.5		50		48	3-10-06	1430	AF
12.5%	125		100		Comments:			
25%	250		200					
50%	500		400					
75%	750		600					
100%	1000		800					

RECORD OF METERS USED FOR WATER QUALITY MEASUREMENTS

STUDY: 14320		CLIENT: CH2M HILL - American Samoa				
WATER QUALITIES - A. bahia						
HOURS:	0	24	48 - old	48 - new	72	96
Water Quality Station #	1	2	1	1		
Initials	SS	WJ	AF	AF		
Date	3/8/06	3/9/06	3-10-06	→		

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #		DO meter #		
DO probe #	12	DO probe #	11	
pH meter #	1097	pH meter #	470	
pH probe #	44	pH probe #	45	
S/C meter #	451 3013	S/C meter #	451 3013	
S/C probe #	1	S/C probe #	1	
Salinity meter #	↓	Salinity meter #	↓	

STUDY: 14309
CLIENT: CH2MHill - American Samoa
PROJECT: Wastewater Treatment Plant
TASK: Unionized Ammonia Calculations

Day / Date	Treatment	Temperature Deg C	Sample pH SU	NH ₃ mg/L	Unionized NH ₃ mg/L
Day 0	Lab Diluent	20	7.87	0.1	0.003
	50% Effluent	20	7.22	13.0	0.085
	100% Effluent	20	6.46	23.4	0.027

Report No: 14309
Project: American Samoa

SDG:

Sample ID: 14309-005 E SIN1 LAB SALT 25 ppt
Matrix: Water
Sampled: 03/08/06

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	14309-005	ND	0.1	mg/L as N	03/10/06	03/10/06	SM 4500-NH3 G

Notes:

ND = Not Detected

ESI

Report No: 14326
Project: American Samoa

SDG:

Sample ID: EFFLUENT 100%
Matrix: Water
Sampled: 03/08/06

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	14326-002	23.4	0.1	mg/L as N	03/27/06	03/27/06	SM 4500-NH3 G

Notes:

ESI

Report No: 14326
Project: American Samoa

SDG:

Sample ID: EFFLUENT 50%
Matrix: Water
Sampled: 03/08/06

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	14326-003	13	0.1	mg/L as N	03/10/06	03/10/06	SM 4500-NH3 G

Notes:

ESI

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, N.H. 03843-0778
(603) 926-3345 • (603) 926-3521 Fax
www.envirosystems.com

SAMPLE RECEIPT RECORD FOR CHRONIC TOXICITY EVALUATIONS

STUDY #: 14326		CLIENT: American Samoa		
SAMPLE RECEIPT INFORMATION				
	Start Sample	First Renewal	Second Renewal	Third Renewal
Sample Receipt Date & Time:	3/8/06 1240			
Received By:	SJ			
Delivered Via:	Fed Ex UPS Client Courier ESI ^{PHL}	Fed Ex UPS Client Courier ESI	Fed Ex UPS Client Courier ESI	Fed Ex UPS Client Courier ESI
Logged Into Lab By:	SJ			
Date & Time Logged In:	3/8/06 1240			
SAMPLE CONDITION INFORMATION				
Chain of Custody?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Chain of Custody Signed?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Chain of Custody Complete?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Sample Date?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Sample Time?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Sample Type?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Custody Seal in Place?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Shipping Container Intact?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
Temp Blank Temperature:	0°C			
DOES CLIENT NEED NOTIFICATION OF TEMP?	Yes or <input checked="" type="radio"/> No	Yes or No	Yes or No	Yes or No
Sample Arrived on Ice?	<input checked="" type="radio"/> Yes or No	Yes or No	Yes or No	Yes or No
COMMENTS:	1x5g EFF			

Instructions and Agreement Provisions on Reverse Side